IN THE CLAIMS:

Please cancel claims 1-2, 8, 10-11, 22-26, 30, 32-34, and 43-44 without prejudice.

Please replace the claims as follow.

1-3. (Cancelled)

4. (Previously Presented) The method of claim 48, further comprising:

providing additional concentrations of conductive species, substantially different from the first concentration and the second concentration and different from one another, and then measuring the at least one electrochemical parameter of the electrochemical cell.

5. (Previously Presented) The method of claim 48, further comprising:

adjusting a process variable; and

repeating (b), (c), and (d) in sequence at least one time.

6. (Previously Presented) The method of claim 48, wherein the test concentration has a numerical value that is between the first concentration and the second concentration.

7. (Original) The method of claim 4, wherein the test concentration has a numerical value that falls in a numerical range defined by a largest and a smallest of the group consisting of the first concentration, the second concentration, and the additional concentrations.

8. (Cancelled)

9. (Previously Presented) The method of claim 48, wherein (c) comprises adding conductive species to the electrochemical cell.

10-11. (Cancelled)

12. (Original) A method of determining whether an aqueous system has a concentration of conductive species within a specified range, comprising:

providing an electrochemical cell containing the aqueous system wherein the electrochemical cell has a cell resistance that varies with a concentration of conductive species;

determining a relationship between the cell resistance of the electrochemical cell and the concentration of conductive species;

measuring one or more electrochemical parameters of the electrochemical cell;

determining a test concentration of conductive species based upon the relationship and the one or more electrochemical parameters; and

concluding the test concentration is within a specified range when the test concentration is less than a pre-determined maximum concentration and more than a predetermined minimum concentration.

13. (Original) The method of claim 12, wherein the conductive species comprise one or more chemical constituents selected from the group of metal ions, hydrogen ions, and hydroxyl ions.

14. (Original) The method of claim 12, wherein the determining of the relationship between the cell resistance and the concentration of conductive species further comprises:

(a) providing a first concentration of conductive species;

(b) measuring at least one electrochemical parameter of the electrochemical cell;

(c) providing a second concentration of conductive species different than the first concentration of conductive species; and then

(d) measuring the at least one electrochemical parameter of the electrochemical cell.

15. (Original) The method of claim 14, further comprising:

providing additional concentrations of conductive species, substantially different from the first concentration and the second concentration and different from one another, and then measuring the one or more electrochemical parameters of the electrochemical cell.

16. (Original) The method of claim 14, further comprising:

adjusting a process variable; and

repeating (b), (c), and (d) in sequence at least once.

17. (Original) The method of claim 14, wherein the test concentration has a numerical value that is between the first concentration and the second concentration.

18. (Original) The method of claim 15, wherein the test concentration has a numerical value that falls in a numerical range defined by the largest and smallest of the first concentration, the second concentration, and the additional concentrations.

19. (Original) The method of claim 12, wherein the one or more electrochemical parameters comprise a cell voltage.

20. (Original) The method of claim 14, wherein (c) comprises adding conductive species to the electrochemical cell.

21. (Original) The method of claim 12, wherein the electrochemical cell has an electrical conductivity between about 40 milisiemens/cm^2 and about 1000 milisiemens/cm^2.

22-27. (Cancelled)

28. (Previously Presented) The method of claim 49, further comprising:

providing additional concentrations of conductive species, substantially different from the first concentration and the second concentration and different from one another, and then measuring the one or more electrochemical parameters of the electrochemical cell.

29. (Previously Presented) The method of claim 49, further comprising:

adjusting a process variable; and

repeating (b), (c), and (d) in sequence at least one time.

30. (Cancelled)

31. (Previously Presented) The method of claim 49, wherein (c) comprises adding conductive species to the electrochemical cell.

32-34. (Cancelled)

35. (Original) The method of claim 29, wherein the process variable is a cell current.

36. (Original) The method of claim 29, wherein the anode comprises copper.

37-44. (Cancelled)

45. (Original) A method for determining the concentration of a conductive species in an electrochemical cell, comprising:

determining the relationship between the resistance of the electrochemical cell and the concentration of the conductive species by:

(a) providing a liquid containing a known concentration of conductive species;

(b) establishing an electrical circuit including an anode and a cathode in the liquid and a measuring device selected from the group consisting of a voltmeter and an ammeter;

(c) passing an electrical current of known voltage or current through the circuit;

(d) calculating the resistance of the liquid by applying Ohm's Law; and

(e) repeating (a) – (d) one or more times with liquid having a different known concentration of the conductive species until the relationship is determined;

providing a test liquid system containing an unknown concentration of a conductive liquid species;

repeating (b) and (c) with the test liquid;

measuring the voltage or amperage in the circuit; and

determining from the relationship and the voltage or amperage the concentration of conductive species in the test liquid.

46. (Original) The method of claim 45, wherein the measuring the voltage is continuous during at least a part of an electroplating operation and the concentration of the conductive species is continuously determined during at least a part of the measuring the voltage.

47. (Original) The method of claim 46, wherein the concentration of the conductive species is continuously modified in response to the determining from the relationship.

48. (Previously Presented) A method of determining a test concentration of conductive species in an aqueous system, comprising:

determining a relationship between cell resistance of an electrochemical cell and concentration of conductive species, including:

(a) providing a first concentration of conductive species;

(b) measuring at least one electrochemical parameter of the electrochemical cell;

(c) providing a second concentration of conductive species different than the first concentration of conductive species; and then

(d) measuring the at least one electrochemical parameter of the electrochemical cell;

measuring an electrochemical parameter of the electrochemical cell; and

determining the test concentration of conductive species based upon the relationship and the electrochemical parameter.

49. (Previously Presented) A method of measuring a concentration of conductive species in an electrochemical plating bath contained in an electroplating cell having an anode and a cathode, comprising:

determining a relationship between cell resistance of the electrochemical cell and the concentration of conductive species, including:

(a) providing a first concentration of conductive species;

(b) measuring at least one electrochemical parameter of the electrochemical cell;

(c) providing a second concentration of conductive species different than the first concentration of conductive species; and then

(d) measuring the at least one electrochemical parameter of the electrochemical cell;

beginning an electroplating operation by electrically biasing the anode and the cathode;

during the electroplating operation, measuring an electrochemical parameter of the electrochemical cell; and

determining the concentration of conductive species based upon the determined relationship and the electrochemical parameter.